

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 3347-1-2 (1979): Dimensions for Porcelain Transformer Bushings for Use in Lightly Polluted Atmospheres, Part I: Up to and Including 1 kV, Section 2: Metal Parts [ETD 6: Electrical Insulators and Accessories]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



Disht

IS : 3347 (Part I/Sec 2) - 1979
(Reaffirmed 1999)

Indian Standard
DIMENSIONS FOR PORCELAIN
TRANSFORMER BUSHINGS FOR USE IN
NORMAL AND LIGHTLY POLLUTED
ATMOSPHERES

PART I UP TO AND INCLUDING 1 kV

Section 2 Metal Parts

(First Revision)

Third Reprint JULY 2004

UDC 621.315.626-2 : 621.315 : 612.2 : 006.78 : 621.314.21

© Copyright 1980

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

AMENDMENT NO. 1 JUNE 1982

TO

IS:3347(Part I/Sec 2)-1979 DIMENSIONS FOR PORCELAIN
TRANSFORMER BUSHINGS FOR USE IN NORMAL
AND LIGHTLY POLLUTED ATMOSPHERES

PART I UP TO AND INCLUDING 1 kV

Section 2 Metal Parts

(First Revision)

Alteration

(Page 6, clause 2.1, informal table, last entry) -
Substitute the following for the existing:

<i>'Metal Part or Accessory</i>	<i>For Bushing with Copper Stem</i>	<i>For Bushing with Aluminium Stem</i>
Connecting lug	For 1 000 and 2 000 A brass conforming to Grade 3 of IS:292-1961** or to IS:3488- 1966† For 3 150 A copper chromium alloy	Aluminium alloy conforming to A-6-M designation of IS:617-1975* or any other suitable aluminium alloy to be agreed between the manufacturer and the purchaser.'

Addendum

*(Page 6, foot-note with '†' mark) - Add the
following new foot-note after '†' mark:*

*'**Specification for brass ingots and castings
(revised):'*

(ETDC 3)

AMENDMENT NO. 2 APRIL 1987
TO
IS : 3347 (Part 1/Sec 2)-1979 DIMENSIONS FOR
PORCELAIN TRANSFORMER BUSHINGS FOR
USE IN NORMAL AND LIGHTLY
POLLUTED ATMOSPHERES

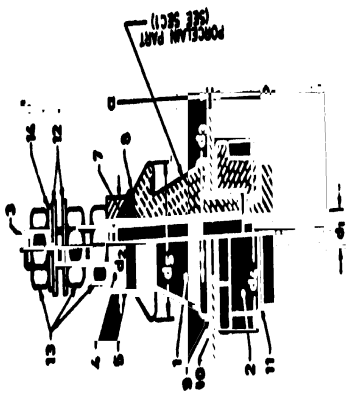
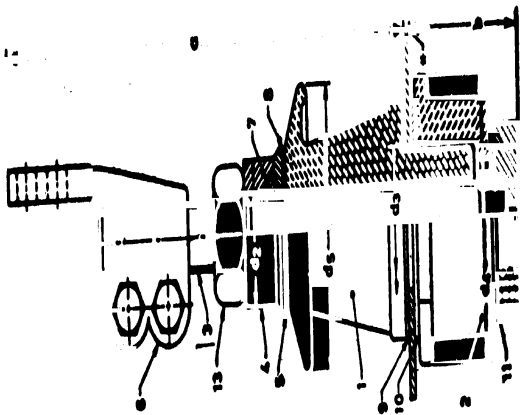
PART 1 UP TO AND INCLUDING 1 kV

Section 2' Metal Parts

(First Revision)

(Page 17, Fig. 13, informal table, col 9) — Substitute '120' for '100' against Bushing Rating with Copper Stem 1/3 150.

(Page 18, Fig. 14) — Substitute the figure given on page 2 for the existing figure.



- 14A 250 and 630A
1. Insulator (top)
 2. Insulator (bottom)
 3. Stem
 4. Washer (top end)
 5. Washer (stem)
 6. Connecting lug (stem)
 7. Sealing washer (stem)
- 14B 1000, 2000 and 3130A
8. Sealing washer Type M
 9. General purpose washer
 10. Gasket X
 11. Gasket R
 12. Washer according to IS : 2016-1967†
 13. Nut
 14. Spring washer Type B according to IS : 3063-1972‡
- *4 to 8 up to and including 1 000 A, and 6 to 10 above 1 000 A.
†Specification for plain washers (first revision).
‡Specification for single coil rectangular section springs washers for bolts, nuts and screws (first revision).

All dimensions in millimetres.

TYPE OF STEM	BUSHING RATING kV A	a	b	d ₁	d ₂	d ₃	d ₄	d ₅	d ₆	d ₇	d ₈	d ₉
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)				
Aluminium	Up to and including 1/250	138	68	M12	28	28	60	50				
	Up to and including 1/630	240	68	M30 × 2	56	56	110	90				
	Up to and including 1/1 000	372	65	M42 × 3	70	70	150	125				
	Up to and including 1/3 150	—	70	M48 × 3	80	—	—	—				
Copper	Up to and including 1/250	138	68	M12	28	28	60	50				
	Up to and including 1/630	240	82	M30 × 2	40	45	85	70				
	Up to and including 1/1 000	372	65	M42 × 3	56	56	110	104				
	Up to and including 1/3 150	—	70	M48 × 3	70	90	150	125				

FIG. 14 ASSEMBLY OF BUSHING

(ETDC 3)

AMENDMENT NO. 3 MARCH 1989
TO
IS : 3347 (Part 1/Sec 2) - 1979 DIMENSIONS FOR
PORCELAIN TRANSFORMER BUSHINGS FOR
USE IN NORMAL AND LIGHTLY POLLUTED
ATMOSPHERES

PART 1 UP TO AND INCLUDING 1 kV
Section 2 Metal Parts
(*First Revision*)

(*First cover, pages 1 and 3, title*) — Substitute the following for the existing title:

'Indian Standard
DIMENSIONS FOR PORCELAIN TRANSFORMER
BUSHINGS FOR USE IN LIGHTLY POLLUTED
ATMOSPHERES

PART 1 UP TO AND INCLUDING 1 kV
Section 2 Metal Parts
(*First Revision*)'

(*Page 3, clause 0.3, first and second lines*) }
(*Page 5, clause 1.1, third line*) } Delete the words 'normal and'.

(*Page 15, Fig. 12*) — Substitute the figure given on page 2 for the existing figure.

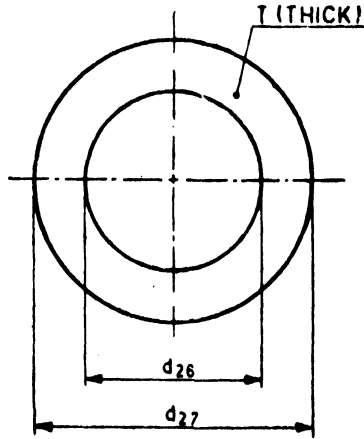


FIG. 12 GASKET (R AND X TYPE)

All dimensions in millimetres.

TYPE	RATING kV/A	BUSHING WITH ALUMINIUM STEM			BUSHING WITH COPPER STEM		
		d_{26}	d_{27}	T	d_{26}	d_{27}	T
R	1/250	45	70	3	28	50	3
R	1/630	56	90	3	40	70	3
R	1/1 000	70	104	3	45	70	3
R	1/2 000	90	125	3	70	104	3
R	1/3 150	—	—	—	90	125	3
X	1/250	40	70	3	25	50	3
X	1/630	45	70	3	45	70	3
X	1/1 000	63	90	3	56	90	3
X	1/2 000	80	110	3	70	104	3
X	1/3 150	—	—	—	90	125	3

(ETDC 3)

Indian Standard
**DIMENSIONS FOR PORCELAIN
TRANSFORMER BUSHINGS FOR USE IN
NORMAL AND LIGHTLY POLLUTED
ATMOSPHERES**

PART I UP TO AND INCLUDING 1 kV

Section 2 Metal Parts

(First Revision)

Electrical Insulators and Accessories Sectional Committee, ETDC 3

Chairman

SHRI L. C. JAIN

Representing

Ministry of Energy, New Delhi

Members

SHRI V. R. ANANTHANARAYANAN Bengal Potteries Ltd, Calcutta

SHRI CHANDER PARKASH (*Alternate*)

SHRI B. C. BANERJEE All India Pottery Manufacturers' Association,
Calcutta

SHRI B. C. DAW (*Alternate*)

SHRI D. S. CHADHAL Directorate General of Technical Development,
New Delhi

SHRI R. T. CHARI Tag Corporation, Madras

SHRI A. GURUPATHIAM (*Alternate*)

SHRI K. S. CHELLAPPAN Tamil Nadu Electricity Board, Madras

SHRI N. R. SANKARAN (*Alternate*)

SHRI A. K. CHOPRA Punjab State Electricity Board, Patiala

SHRI NIRVAIR SINGH (*Alternate*)

SHRI A. N. DEB Damodar Valley Corporation, Calcutta

SHRI A. C. BOSE (*Alternate*)

DIRECTOR OF RESEARCH (T & D) Maharashtra State Electricity Board, Bombay

DIRECTOR (TRACTION AND INS- Research, Designs and Standards Organization,
TALLATION) Ministry of Railways, Lucknow

JOINT DIRECTOR STANDARDS (T1)
(*Alternate*)

(Continued on page 2)

© Copyright 1980

BUREAU OF INDIAN STANDARDS

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

IS : 3347 (Part I/Sec 2) - 1979

(Continued from page 1)

<i>Members</i>	<i>Representing</i>
DIRECTOR (TRANSMISSION) DEPUTY DIRECTOR (SUBSTATION) (Alternate)	Central Electricity Authority, New Delhi
GENERAL MANAGER (T) DIRECTOR OF TELEGRAPHS (L) (Alternate) DIVISIONAL ENGINEER TELEGRAPHS (C) (Alternate)	Directorate General of Posts & Telegraphs, Jabalpur
SHRI B. N. GHOSH	Bharat Heavy Electricals Ltd, Bhopal
SHRI H. M. S. LINGAIAH	Karnataka Electricity Board, Bangalore
SHRI G. S. MAHAGAONKAR	Mysore Porcelains Ltd, Bangalore
SHRI S. K. MUKHERJEE SHRI U. S. VERMA (Alternate)	National Test House, Calcutta
DR G. M. PHADKE SHRI C. R. VARRIER (Alternate)	Indian Electrical Manufacturers' Association, Bombay
SHRI P. S. RAMAN SHRI E. P. WILFRED (Alternate)	NGE Limited, Bangalore
SHRI M. SANKARALINGAM DEPUTY DIRECTOR OF INSPECTION (Alternate)	Directorate General of Supplies & Disposals, New Delhi
SHRI P. K. SAXENA SHRI G. L. DUA (Alternate)	Rural Electrification Corporation Limited, New Delhi
SHRI N. S. SEETHURAMON SHRI V. SRINIVASAN (Alternate)	W. S. Insulators of India Ltd, Madras
DR U. S. SINGH SHRI A. D. DUA (Alternate)	High Tension Insulator Factory, Ranchi
SHRI SURENDRA SINGH SHRI T. B. L. SRIVASTAVA (Alternate)	U. P. Government Pottery Development Centre, Khurja
SHRI L. VENKATESUBBU SHRI R. V. ACHUTHIAN (Alternate)	Seshasayee Industries Ltd, Vadalur South Arcot District
SHRI S. P. SACHDEV, Director (Elec tech)	Director General, ISI (Ex-officio Member)

Secretary

SHRI R. S. SARMA

Assistant Director (Elec tech), ISI

(Continued on page 19)

Indian Standard

DIMENSIONS FOR PORCELAIN TRANSFORMER BUSHINGS FOR USE IN NORMAL AND LIGHTLY POLLUTED ATMOSPHERES

PART I UP TO AND INCLUDING 1 kV

Section 2 Metal Parts

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part I/Sec 2) (First Revision) was adopted by the Indian Standards Institution on 29 August 1979, after the draft finalized by the Electrical Insulators and Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard was first issued in 1967. This revision has been undertaken with a view to achieve improved connection arrangements; external connection arrangement in the case of bushings of 250 to 630 A and internal connection arrangement in the case of bushings for 1 000, 2 000 and 3 150 A and incorporates the amendment issued to the earlier edition.

0.3 The dimensions of porcelain parts of the bushings for use in normal and lightly polluted atmospheres of up to and including 1 kV are covered in IS : 3347 (Part I/Sec 1)-1979*. This section (Section 2), which is a necessary adjunct to Section 1, lays down the dimensions of the metal parts and accessories of the bushings to go with the porcelain parts specified in Section 1. The materials for the metal parts and accessories have also been specified.

0.4 The need for changing over to aluminium for the metal parts of bushings has been fully recognized. This section, therefore, includes complete sets of dimensions of parts using aluminium as well as copper. Dimensions for copper parts have been given to ensure a smooth change-over to aluminium. These are expected to be deleted in due course.

0.5 In this section the dimensions of metal parts have been formulated in such a way that the porcelain parts available in Section 1 of this standard

*Dimensions for porcelain transformer bushings for use in normal and lightly polluted atmospheres : Part I Up to and including 1 kV, Section 1 Porcelain parts (*first revision*).

IS : 3347 (Part I/Sec 2) - 1979

may be used both for aluminium as well as copper metal parts. Suitable references are given to indicate the appropriate porcelain part at each place.

0.6 For a current rating of 3 150 A, no aluminium metal parts have been specified. In such a case the use of copper metal parts only is recommended.

0.7 To cover the dimensions of bushings of various voltage classes, IS : 3347 has been prepared in different parts. Other parts of this standard are:

Part II 3·6 kV bushings

Section 1 Porcelain parts

Section 2 Metal parts

Part III 12 and 17·5 kV bushings

Section 1 Porcelain parts

Section 2 Metal parts

Part IV 24 kV bushings

Section 1 Porcelain parts

Section 2 Metal parts

Part V 36 kV bushings

Section 1 Porcelain parts

Section 2 Metal parts

Part VI 72·5 kV bushings

Section 1 Porcelain parts

Section 2 Metal parts (*under preparation*)

Part VII 123 kV bushings

Section 1 Porcelain parts

Section 2 Metal parts (*under preparation*)

0.8 The performance requirements of the bushings covered in this part of the standard are given in IS : 7421-1974*.

0.9 The dimensions for porcelain transformer bushings for use in heavily polluted atmospheres are covered by IS : 8603 (Parts I to III)-1977†. The metal parts covered by this section may be used for bushings covered by IS : 8603 (Parts I to III)-1977†.

0.10 In the preparation of this standard, assistance has been derived from DIN 42530 (1968) ' Indoor and outdoor transformer bushings, voltage class 1 kV, 250 to 3 150 A ', issued by Deutscher Normenausschuss.

*Specification for porcelain bushing for alternating voltages up to and including 1 000 V.

†Dimensions for porcelain transformer bushings for use in heavily polluted atmospheres:

Part I 12 and 17·5 kV bushings

Part II 24 kV bushings

Part III 36 kV bushings

IS : 3347 (Part I/Sec 2) - 1979

0.11 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part I/Sec 2) lays down the dimensions and materials of metal parts and accessories of bushings of up to and including 1 kV, used with transformers, for use in normal and lightly polluted atmospheres.

2. MATERIALS

2.1 The material of various parts shall conform to the relevant Indian Standards specified below:

<i>Metal Part or Accessory</i>	<i>For Bushing with Copper Stem</i>	<i>For Bushing with Aluminium Stem</i>
Hexagonal nut	Brass conforming to 2.2 of IS : 1364-1967†	Aluminium alloy conforming to 2.2 of IS : 1364-1967†
Stem	Copper rods conforming to IS : 613-1964‡	Aluminium conforming to Electrical grade of IS : 4026-1969§ or any other suitable aluminium alloy to be agreed between the manufacturer and the purchaser
Nut	Brass conforming to IS : 3488-1966 or Grade 2 of IS : 292-1961¶ or IS : 319-1974**.	do
Washer (top end)	Brass conforming to Type I of IS : 319-1974** or IS : 3488-1966	do
Washer (stem)	Brass conforming to Type I of IS : 319-1974** or IS : 3488-1966	do

*Rules for rounding off numerical values (revised).

†Specification for precision and semi-precision hexagon bolts, screws, nuts and lock nuts (diameter range 6 to 39 mm) (first revision).

‡Specification for copper rods for electrical purposes (revised).

§Specification for aluminium ingots (EC grade) (first revision).

¶Specification for brass bars, rods and sections suitable for forging.

¶¶Specification for brass ingots and castings (revised).

**Specification for free-cutting brass bars, rods and sections (third revision).

IS : 3347 (Part I/Sec 2) - 1979

<i>Metal Part or Accessory</i>	<i>For Bushing with Copper Stem</i>	<i>For Bushing with Aluminium Stem</i>
Connecting lug (4.8)	Copper suitable for forging and having conductivity ≥ 45 m/ Ω mm ² and tensile strength ≥ 37 kg/mm ²	Aluminium alloy conforming to A-6-M designation of IS: 617-1975* or any other suitable aluminium alloy to be agreed between the manufacturer and the purchaser

NOTE — For 250 A rated bushing, brass conforming to IS : 3488-1966† may be used for manufacture of stem in place of copper rod.

2.2 The material used for sealing washers for general purposes (four types M, N, P and C) shall be synthetic rubber or synthetic rubber bonded cork. The material used for sealing washers for stem shall be synthetic rubber (acrylic nitrite rubber) having hardness of 70 ± 5 IRHD. Where synthetic insulating transformer coolant is used, the material of the washer shall be silicone rubber or any other resilient material compatible with the transformer coolant.

3. DIMENSIONS

3.1 The hexagonal nuts used shall conform to IS : 1364-1967‡ and IS : 3138-1966§. The threads shall be in accordance with IS : 1362-1962|| and IS : 3139-1966¶.

3.2 Stem

3.2.1 For Up to and Including 1/250 and 630 Rating (Copper Stem) and for Up to and Including 1/250 Rating (Aluminium Stem) — The dimensions shall conform to Fig. 1.

3.2.2 For Up to and Including 1/1 000, 2 000 and 3 150 Rating (Copper Stem) and for Up to and Including 1/630, 1 000 and 2 000 Rating (Aluminium Stem) — The dimensions shall conform to Fig. 2.

*Specification for aluminium and aluminium alloy ingots and castings for general engineering purposes (second revision).

†Specification for brass bars, rods and sections suitable for forging.

‡Specification for precision and semi-precision hexagon bolts, screws nuts and lock nuts (diameter range 6 to 39 mm) (first revision).

§Specification for hexagonal bolts and nuts (M42 to M150).

||Dimensions for screw threads for general purposes (diameter range 1.6 to 39 mm) (revised).

¶Dimensions for screw threads for bolts and nuts (diameter range M42 to M150)

3.3 Nut

3.3.1 For Up to and Including 1/250 and 630 Rating (Copper Stem) and for Up to and Including 1/250 Rating (Aluminium Stem) — The dimensions shall conform to Fig. 3.

3.3.2 For Up to and Including 1/1 000 Rating (Copper Stem) and for Up to and Including 1/630 Rating (Aluminium Stem) — The dimensions shall conform to Fig. 4.

3.3.3 For Up to and Including 1/2 000 and 3 150 Rating (Copper Stem) and for Up to and Including 1/1 000, 2 000 Rating (Aluminium Stem) — The dimensions shall conform to Fig. 5.

3.4 Stem Sub-assembly

3.4.1 For Up to and Including 1 kV/250 and 630 Rating (Copper Stem) and for Up to and Including 1/250 Rating (Aluminium Stem) — The subassembly shall conform to Fig. 6.

3.4.2 For Up to and Including 1/1 000, 2 000 and 1/3 150 Rating (Copper Stem) and for Up to and Including 1/630, 1 000 and 2 000 Rating (Aluminium Stem) — The subassembly shall conform to Fig. 7.

3.5 Washer (Top End) — The washer (top end) shall conform to Fig. 8.

3.6 Washer (Stem) — The washer (stem) shall conform to Fig. 9.

3.7 Sealing Washers

3.7.1 For Stem — The sealing washer for stem shall conform to Fig. 10.

3.7.2 General Purpose (Four Types M, N, O and P) — The general purposes sealing washer shall be in accordance with Fig. 11.

3.7.3 Gasket (R and X Type) — The gasket shall conform to Fig. 12.

3.8 Connecting Lug — The connecting lug shall conform to Fig. 13.

4. TOLERANCES

4.1 Unless otherwise specified allowable tolerance on a dimension of any machined metal part shall be in accordance with medium class of IS: 2102-1969*.

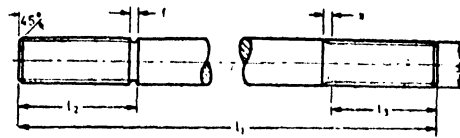
4.2 Unless otherwise specified, allowable tolerance on a dimension of any forged or cast metal part shall be in accordance with coarse class of IS: 2102-1969*.

5. ASSEMBLY

5.1 The assembly of the bushing is shown in Fig. 14.

*Allowable deviations for dimensions without specified tolerances (first revision).

IS : 3347 (Part I/Sec 2) - 1979

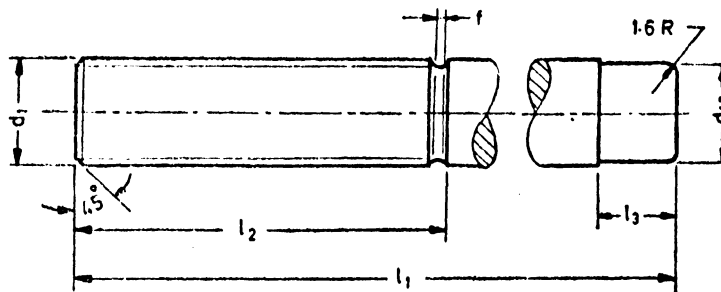


All dimensions in millimetres.

NOTE — The chamfered ends shall be in accordance with IS : 1368-1967* and f and \star shall be in accordance with IS : 1369-1961†.

TYPE OF STEM	BUSHING RATING kV/A UP TO AND INCLUDING	CORRESPONDING RATING OF PORCELAIN PART OF SEC 1 kV/A UP TO AND INCLUDING	d_1	l_1	l_2	l_3
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Copper and aluminium	1/250	1/250	M12	205	67	38.5
Copper	1/630	1/630	M20	260	96	53

FIG. 1 STEM FOR 250 AND 630 A RATING



All dimensions in millimetres.

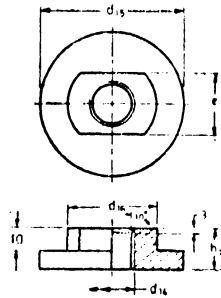
TYPE OF STEM	BUSHING RATING kV/A UP TO AND INCLUDING	CORRESPONDING RATING OF PORCELAIN PART OF SEC 1 kV/A UP TO AND INCLUDING	d_1	$d_{13} \text{ } \phi 8$	l_1	l_2	l_3
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aluminium	1/630	1/1 000	M30×2	29	248	106	24
Copper	1/1 000	1/1 000	M30×2	29	248	106	24
Aluminium	1/1 000	1/2 000	M42×3	41	290	140	29
Copper	1/2 000	1/2 000	M42×3	41	290	140	29
Aluminium	1/2 000	1/3 150	M48×3	47	300	145	34
Copper	1/3 150	1/3 150	M48×3	47	300	145	34

NOTE — f shall be in accordance with IS : 1369-1961 'Dimensions of screw threads run-outs and undercuts (first revision)'.
†Dimensions of screw threads run-outs and undercuts (first revision).

FIG. 2 STEM FOR 1 000, 2 000 AND 3 150 A RATING

*Dimensions of ends of bolts and screws (first revision).

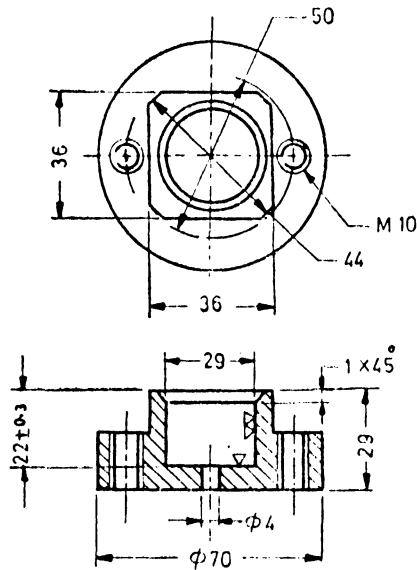
†Dimensions of screw threads run-outs and undercuts (first revision).



All dimensions in millimetres.

TYPE OF STEM	BUSHING RATING kV/A UP TO AND INCLUDING	CORRESPONDING RATING OF PORCELAIN PART OF SEC 1 kV/A UP TO AND INCLUDING	d_{14}	d_{15}	d_{16} <i>Max</i>	h_7	e_8 <i>Max</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aluminium and copper	1/250	1/250	M12	45	24	15	19
Copper	1/630	1/630	M20	63	39	18	27

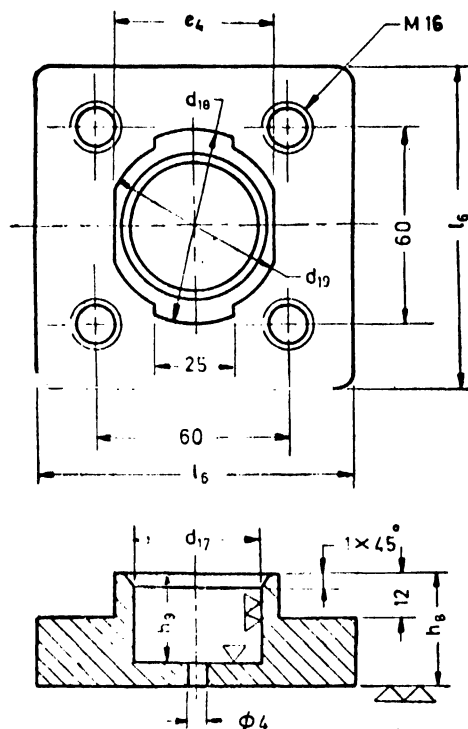
FIG. 3 NUT FOR 250 AND 630 A RATING



All dimensions in millimetres.

FIG. 4 NUT FOR 630 AND 1000 A RATING

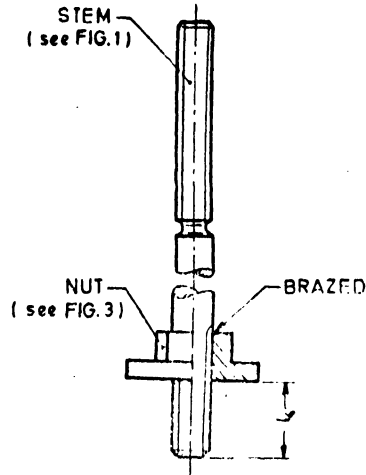
IS : 3347 (Part I/Sec 2) - 1979



All dimensions is millimetres.

TYPE OF STEM	BUSHING RATING kV/A UP TO AND INCLUDING	CORRES- PONDING RATING OF PORCELAIN PART OF SEC 1 kV/A UP TO AND INCLUDING	d_{17} h_8	d_{18} Max	d_{19} Max	h_8	h_9 ± 0.3	e_4 Max	l_6
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Aluminium	1/1 000	1/1 000	41	62	56	34	27	50	100
Copper	1/2 000	1/2 000	41	62	56	34	27	50	100
Aluminium	1/2 000	1/3 150	47	78	66	39	32	60	110
Copper	1/3 150	1/3 150	47	78	66	39	32	60	110

FIG. 5 NUT FOR 2000 AND 3150 A RATING

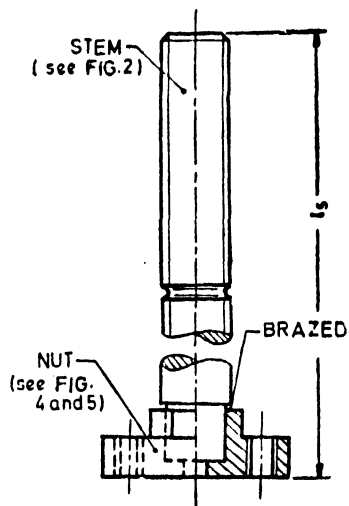


All dimensions in millimetres.

TYPE OF STEM	BUSHING RATING kV/A UP TO AND INCLUDING	CORRESPONDING RATING OF PORCELAIN PART OF SEC 1 kV/A UP TO AND INCLUDING	$I_4 \pm 0.3$	STEM	NUT
(1)	(2)	(3)	(4)	(5)	(6)
Copper and aluminium	1/250	1/250	25	See Fig. 1	See Fig. 3
Copper	1/630	1/630	37	See Fig. 1	See Fig. 3

FIG. 6 STEM SUB-ASSEMBLY (250 AND 630 A RATING)

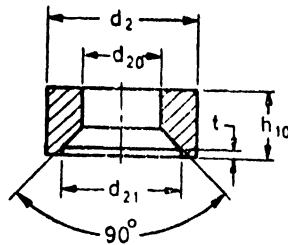
IS : 3347 (Part I/Sec 2) - 1979



All dimensions in millimetres.

TYPE OF STEM	BUSHING RATING kV/A UP TO AND INCLUDING	CORRESPONDING RATING OF PORCELAIN PART OF SEC 1 kV/A UP TO AND INCLUDING	l_5	STEM	NUT
(1)	(2)	(3)	(4)	(5)	(6)
Aluminium	1/630	1/1 000	255	See Fig. 2	See Fig. 4
Copper	1/1 000	1/1 000	255	See Fig. 2	See Fig. 4
Aluminium	1/1 000	1/2 000	297	See Fig. 2	See Fig. 5
Copper	1/2 000	1/2 000	297	See Fig. 2	See Fig. 5
Aluminium	1/2 000	1/3 150	307	See Fig. 2	See Fig. 5
Copper	1/3 150	1/3 150	307	See Fig. 2	See Fig. 5

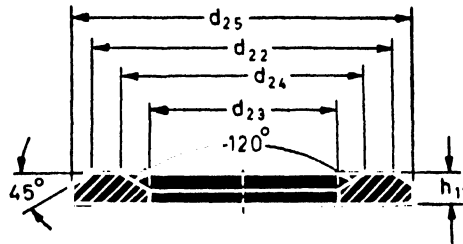
FIG. 7 STEM SUB-ASSEMBLY (630, 1 000, 2 000 AND 3 150 A RATING)



All dimensions in millimetres.

BUSHING RATING kV/A	BUSHING WITH ALUMINIUM STEM					BUSHING WITH COPPER STEM				
	d_2	d_{20}	d_{21}	h_{10}	t	d_2	d_{20}	d_{21}	h_{10}	t
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Up to and including 1/250	28	13	22	20	1.5	28	13	22	20	1.5
Up to and including 1/630	56	31	45	24	3	40	21	32	22	2
Up to and including 1/1 000	70	43	59	26	3	56	31	45	24	3
Up to and including 1/2 000	80	50	65	26	3	70	43	59	26	3
Up to and including 1/3 150	—	—	—	—	—	80	50	65	26	3

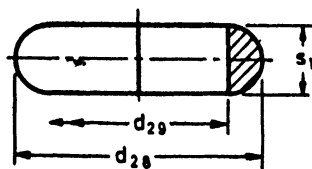
FIG. 8 WASHER (TOP END)



All dimensions in millimetres.

BUSHING RATING kV/A	BUSHING WITH ALUMINIUM STEM					BUSHING WITH COPPER STEM				
	d_{22}	d_{23}	d_{24}	d_{25}	h_{11}	d_{22}	d_{23}	d_{24}	d_{25}	h_{11}
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Up to and including 1/250	28	13	22	32	4	28	13	22	32	4
Up to and including 1/630	56	31	45	65	6	40	21	32	47	5
Up to and including 1/1 000	70	43	59	80	7	56	31	45	65	6
Up to and including 1/2 000	80	50	65	100	8	70	43	59	80	7
Up to and including 1/3 150	—	—	—	—	—	80	50	65	100	8

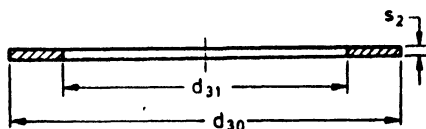
FIG. 9 WASHER (STEM)



All dimensions in millimetres.

BUSHING RATING kV/A	BUSHING WITH ALUMINIUM STEM			BUSHING WITH COPPER STEM		
	$d_{28} \pm 0.3$	d_{29}	s_1	$d_{28} \pm 0.3$	d_{29}	s_1
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Up to and including 1/250	22	12	11	22	12	11
Up to and including 1/630	45	30	16	32	20	13
Up to and including 1/1 000	59	42	18	45	30	16
Up to and including 1/2 000	65	48	18	59	42	18
Up to and including 1/3 150	—	—	—	65	48	18

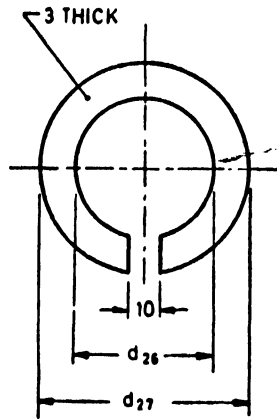
FIG. 10 SEALING WASHER FOR STEM



All dimensions in millimetres.

TYPE	BUSHING RATING kV/A	BUSHING WITH ALUMINIUM STEM			BUSHING WITH COPPER STEM		
		d_{30}	d_{31}	s_2	d_{30}	d_{31}	s_2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M	Up to and including 1/250	32	14	2	32	14	2
M	Up to and including 1/630	65	32	2	47	22	2
M	Up to and including 1/1 000	80	45	2	65	32	2
M	Up to and including 1/2 000	100	50	2	80	45	2
M	Up to and including 1/3 150	—	—	—	100	50	2
N	Up to and including 1/250	50	28	4	50	28	4
N	Up to and including 1/630	90	56	4	70	45	4
N	Up to and including 1/1 000	104	70	4	90	56	4
N	Up to and including 1/2 000	125	90	4	104	70	4
N	Up to and including 1/3 150	—	—	—	125	90	4
P	Up to and including 1/250	45	25	2	45	25	2
P	Up to and including 1/630	—	—	—	63	40	2
O	Up to and including 1/250	50	28	2	50	28	2
O	Up to and including 1/630	—	—	—	70	45	2

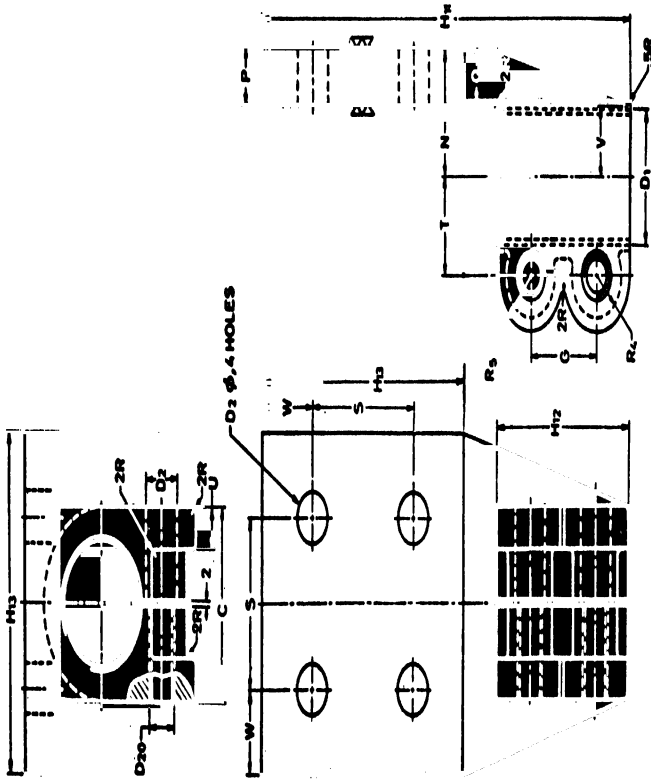
FIG. 11 GENERAL PURPOSE WASHER (FOUR TYPES M, N, O AND P)



All dimensions in millimetres.

TYPE	BUSHING RATING kV/A	BUSHING WITH ALUMINIUM STEM		BUSHING WITH COPPER STEM	
		d_{26}	d_{27}	d_{26}	d_{27}
(1)	(2)	(3)	(4)	(5)	(6)
R	Up to and including 1/630	45	70	—	—
R	Up to and including 1/1 000	63	90	45	70
R	Up to and including 1/2 000	80	110	63	90
R	Up to and including 1/3 150	—	—	80	110
X	Up to and including 1/630	56	90	—	—
X	Up to and including 1/1 000	70	104	56	90
X	Up to and including 1/2 000	90	125	70	104
X	Up to and including 1/3 150	—	—	90	125

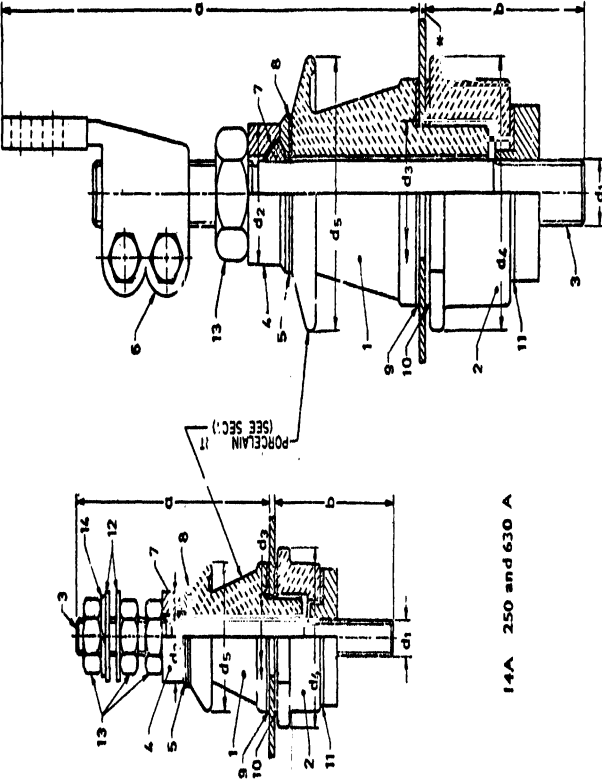
FIG. 12 GASKET (R AND X TYPES)



All dimensions in millimetres.

DIMENSIONS IN MM UP TO AND INCLUDING	WIRE ALUMINUM STRIP																		WIRE COPPER STRIP																	
	C	D ₁	D ₂	D ₃	G	H ₁₁	H ₁₂	H ₁₃	S	W	N	T	P	Q	R ₁	R ₂	R ₃	U	V																	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)																		
1/1 000	56	M42×3	18	M16	40	195	80	100	50	25	45	35	20	18	15	20	15	26																		
1/2 000	68	M48×3	18	M16	40	220	80	120	60	30	45	35	20	18	15	20	15	30																		

Fig. 13 Connecting Lug



14A 250 and 630 A

14B 1 000, 2 000 and 3 150 A

1. Insulator top
2. Insulator bottom
3. Stem
4. Washer (top end)
5. Washer (stem)
6. Connecting lug
7. Sealing washer (stem)
8. Sealing washer Type M
9. Gasket X
10. Gasket Y
11. Washer according to IS : 2016-1967†
12. Nut
13. Spring washer Type B according to IS : 3063-1972‡

*4 to 8 up to and including 1 000 A, and 6 to 10 above 1 000 A.
†Specification for plain washers (first revision).
‡Specification for single coil rectangular section spring washers for bolts, nuts and screws (first revision).

All dimensions in millimetres.

TYPE OF STEM	BUSHING RATING KV/A	All dimensions in millimetres.									
		a	b	d ₁	d ₂	d ₃	d ₄	d ₅	d ₆	d ₇	d ₈
Aluminium	(1)	(3)	Max	(5)	(6)	(7)	(8)	(9)			
	Up to and including 1/250	138	68	M12	28	28	28	50			
	Up to and including 1/630	263	82	M30 × 2	56	56	56	60			
	Up to and including 1/1 000	340	65	M42 × 3	70	70	70	70			
Copper	(2)	(4)	Max	(5)	(6)	(7)	(8)	(9)			
	Up to and including 1/250	372	70	M48 × 3	80	80	80	104			
	Up to and including 1/630	138	82	M12	28	28	28	50			
	Up to and including 1/1 000	263	60	M30 × 2	56	56	56	60			
	(3)	(3)	Max	(5)	(6)	(7)	(8)	(9)			
	Up to and including 1/250	372	70	M48 × 3	80	80	80	104			
	Up to and including 1/630	138	82	M12	28	28	28	50			
	Up to and including 1/1 000	263	60	M30 × 2	56	56	56	60			

FIG. 14 ASSEMBLY OF BUSHING

IS : 3347 (Part I/Sec 2) - 1979

(Continued from page 2)

Panel for Dimensions of Bushings, ETDC 3 : P3

<i>Convener</i>	<i>Representing</i>
SHRI V. SRINIVASAN	W. S. Insulators of India Ltd, Madras
<i>Members</i>	
SHRI K. N. JAYARAM	Mysore Porcelains Ltd, Bangalore
SHRI S. V. MANERIKAR	Crompton Greaves Ltd, Bombay
SHRI M. L. MITTAL	Bharat Heavy Electricals Ltd, Bhopal
SHRI S. P. SINGH (Alternate)	
SHRI R. G. PRADHANANI	Bharat Bijlee Ltd, Bombay
SHRI P. RAMACHANDRAN	Transformers & Electricals Kerala Ltd, Angamally, South P. O.
SHRI KURIAKOSE ANTONY (Alternate)	
SHRI P. S. RAMAN	NGEF Limited, Bangalore
DR U. S. SINGH	High Tension Insulator Factory, Ranchi
SHRI A. D. DUA (Alternate)	

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 23230131, 23233375, 23239402

Fax: 91+011 23239399, 23239382

E - Mail : bis@vsnl.com

website : <http://www.bis.org.in>

Central Laboratory:

Plot No. 20/9, Site IV, Sahibabad Industrial Area, SAHIBABAD 201010

Telephone

27700 32

Regional Offices:

Central: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	2323 76 17
*Eastern: 1/14 CIT Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054	2337 86 62
Northern: SCO 335-336, Sector 34-A, CHANDIGARH 160022	260 38 43
Southern: C.I.T. Campus, IV Cross Road, CHENNAI 600113	2254 19 84
Western: Manakalaya, E9, MIDC, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093	2832 92 95

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001	560 13 48
Peenya Industrial Area, 1 st Stage, Bangalore-Tumkur Road, BANGALORE	839 49 55
Commercial-cum-Office Complex, Opp. Dushera Maidan, E-5 Arera Colony, Bittan Market, BHOPAL 462016	242 34 52
62-63, Ganga Nagar, Unit VI, BHUBANESHWAR 751001	240 31 39
5 th Floor, Kovai Towers, 44 Bala Sundaram Road, COIMBATORE 641018	221 01 41
SCO 21, Sector 12, Faridabad 121007	229 2175
Savitri Complex, 116 G.T. Road, GHAZIABAD 201001	286 1498
Plot No A-20-21, Institutional Area, Sector 62, Goutam Budh Nagar, NOIDA-201307	240 22 06
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, Apurba Sinha Path, GUWAHATI 781003	254 11 37
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001	2320 10 84
E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001	237 38 79
117/418 B, Sarvodaya Nagar, KANPUR 208005	221 82 92
Sethi Bhawan, 2 nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001	221 56 98
NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010	252 51 71
Mahabir Bhavan, 1 st Floor, Ropar Road, NALAGARH 174101	22 14 51
Patliputra Industrial Estate, PATNA 800013	226 28 08
First Floor, Plot Nos 657-660, Market Yard, Gultkdi, PUNE 411037	426 86 59
"Sahajanand House" 3 rd Floor, Bhaktinagar Circle, 80 Feet Road, RAJKOT 360002	237 82 51
T.C. No. 14/1421, University P.O. Palayam, THIRUVANANTHAPURAM 695034	232 21 04
1 st Floor, Udyog Bhavan, VUDA, Siripuram Junction, VISHAKHAPATNAM-03	271 28 33
Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, KOLKATA 700072	22 12 6215
Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007	2309 65 28